Lung Cancer

Lung cancer generally arises in the epithelial tissue of the lung. Several different histologic or cell types of lung cancer have been observed. The various types of lung cancer occur in different regions of the lung and each type is associated with slightly different risk factors (Blot and Fraumeni 1996). The most common type of lung cancer in the United States today is adenocarcinoma which accounts for about 40% of all lung cancers (ACS, 2000). The greatest established risk factor for all types of lung cancer is cigarette smoking, followed by occupational and environmental exposures.

The incidence of lung cancer increases sharply with age peaking at about age 60 or 70. Lung cancer is very rare in people under the age of 40. The incidence is greater among men than women (probably because men are more likely to be smokers than women) and among blacks than whites (Blot and Fraumeni, 1996). The American Cancer Society estimates that lung cancer will be diagnosed in 171,900 people in the U.S. in 2003, accounting for about 13% of all cancers (ACS, 2003). Lung cancer is the leading cause of cancer death among both men and women; more people die of lung cancer than of colon, breast, and prostate cancers combined (ACS, 2000). In Massachusetts, incidence rates in 1997 were 76.7 per 100,000 and 49.2 per 100,000 for males and females, respectively (MCR, 2000). Nationwide, the incidence rate declined significantly in men during the 1990s, most likely as a result of decreased smoking rates over the past 30 years. Rates for women have continued to increase, but at a much slower pace and have begun to level off. This is because decreasing smoking patterns among women have lagged behind those of men (ACS, 2003). Trends in lung cancer incidence suggest that the disease has become increasingly associated with populations of lower socioeconomic status, since these individuals have higher rates of smoking than individuals of other groups (Blot and Fraumeni 1996).

More than 80% of all lung cancers are caused directly by smoking cigarettes and many of the rest are due to exposure to second hand smoke, or environmental tobacco smoke. The longer a person has been smoking and the higher the number of cigarettes smoked per day, the greater the risk of lung cancer. Smoking cessation decreases the elevated risk by about 50%, however, former smokers still carry a greater risk than those who have never smoked (ACS, 2000).

Workplace exposures have also been identified as playing important roles in the development of lung cancer. Occupational exposure to asbestos is an established risk factor for this disease; asbestos workers are about seven times more likely to die from lung cancer than the general population (ACS, 2000). Underground miners exposed to radon and uranium are at an increased risk for developing lung cancer (ACS, 2000; Samet and Eradze, 2000). Chemical workers, talc miners and millers, paper and pulp workers, carpenters, metal workers, butchers and meat packers, vineyard workers, carpenters and painters, and shipyard and railroad manufacture workers are some of the occupations associated with an increased risk of lung cancer (Blot and Fraumeni, 1996; Pohlablen et al., 2000). In addition to asbestos and radon, chemical compounds such as arsenic, chloromethyl ethers, chromium, vinyl chloride, nickel chromates, coal products, mustard gas, ionizing radiation, and fuels such as gasoline are also occupational risk factors for lung cancer (ACS, 2000; Blot and Fraumeni, 1996). Industrial sand workers exposed to crystalline silica are also at an increased risk for lung cancer (Rice et al., 2001; Steenland and Sanderson, 2001). Occupational exposure to the compounds noted above in conjunction with cigarette smoking dramatically increases the risk of developing lung cancer (Blot and Fraumeni, 1996).

As noted above, exposure to radon (a naturally occurring radioactive gas produced by the

breakdown of radium and uranium) has been associated with increased risk of developing lung cancer among miners. Recently, a number of studies have demonstrated that exposure to elevated levels of residential radon may also increase lung cancer risk (Lubin and Boice, 1997; Kreienbrock et al., 2001; Tomasek et al., 2001). Epidemiological evidence suggests that radon may be the second leading cause of lung cancer after smoking (Samet and Eradze, 2000). However, actual lung cancer risk is determined by cumulative lifetime exposure to indoor radon. Therefore, normal patterns of residential mobility suggest that most people living in high-radon homes experience lifetime exposures equivalent to residing in homes with lower radon levels (Warner et al., 1996).

Tuberculosis and some types of pneumonia may increase the risk of lung cancer due to scarred lung tissue (ACS, 2000). In addition, people who have had lung cancer have a higher risk of developing another tumor. A family history of lung cancer may also slightly increase the risk, however, it is unclear whether this is due to inherited factors or environmental tobacco smoke (ACS, 2000).

Air pollution may increase the risk of developing lung cancer, however, this risk is much lower than that due to cigarette smoking (ACS, 2000).

Diet has also been implicated in the etiology of lung cancer, however, the exact relationship is unclear. Diets high in fruits and vegetables decrease lung cancer risk, but the reasons for this are unknown (Brownson et al., 1998). A recent study showed a positive association between total fat, monounsaturated fat, and saturated fat and lung cancer among males, however, this effect was not observed among women (Bandera et al., 1997).

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